

ing motion towards a point slightly north of east and was accompanied by a sound similar to that produced by the wind in passing through a pine forest. Its mean height was about fifteen feet; color similar to that of the surrounding clouds, a dark leaden hue. No peculiar conditions of the surrounding atmosphere were apparent during its existence. Phenomenon lasted forty-five minutes.

*High Tides.*—Punta Rassa, Fla., 23d, very high; water over one foot deep under office building.

## TEMPERATURE OF WATER.

*The temperature of water*, as observed in rivers and harbors at Signal Service stations, with the average depth at which observations were taken, is given in the table on the left-hand side of chart No. III. Owing to breakage of instrument, observations at Marquette were discontinued from the 14th to the 26th, inclusive. The report from Chincoteague failed to appear in time for publication.

## ATMOSPHERIC ELECTRICITY.

*Auroras.*—The most important display that occurred during the month was that of the 23d which was reported by numerous intervening stations from Osewego westward to Helena, Mont. and southward to Ft. Madison, Ia. At many of the stations reporting, the display was brilliant, beginning early in the evening and lasting until after midnight. The display of the 9th was observed at the following stations: Ft. Bennett, 4 a. m.; Huron, Dak., 5 a. m.; La Crosse, early morning; Clinton, Ia., 1.30 a. m.; Dubuque, 12.30 to 2.30 a. m.; Riley, Ill., 4.10 a. m.; Springfield, Ill., 5.30 a. m.; Milwaukee, early morning. The following stations report the display of the 17th: Clear Creek, Neb.; St. Vincent, Minn. and New Corydon, Ind. The display of the 26th was reported from Ft. Shaw, Mont., Deadwood, Dak., and Northfield, Minn. Other displays have been reported from the following stations: Ft. Shaw, Mont., 22d, from 8 to 11 p. m.; Deadwood, Dak., 27th, 9 p. m.; St. Vincent, Minn., 20th, 7 p. m.; Moorehead, Minn., 10th, 5 to 5.30 a. m.; Embarrass, Wis., 19th, p. m.; New Corydon, Ind., 20th, 2 a. m.; Vevay, Ind., 12th, 8 a. m., 13th, p. m.; Port Huron, Mich., 22d, 8.40 to 9.15 p. m.; Oswego, 2d, 7.45 to 8.15 p. m., 16th, 11.30 p. m., to midnight; Newport, R. I., 16th, 11 p. m., to a. m., of 17th; Auburn, N. H., 10th; Dexter, Me., 14th; Gardiner, Me., 27th, 11.30 p. m., to 3.30 a. m., of 28th.

*Thunder Storms.*—They were reported in the various districts as follows: New England, 9th, 15; Middle Atlantic states, 8th, 9th; South Atlantic states, 9th, 30th; East Gulf states, 2d, 6th, 8th, 11th, 12th, 20th, 30th; West Gulf states, 1st, 7th, 8th to 11th, 18th, 21st, 30th; Ohio valley and Tennessee, 8th, 9th, 16th, 17th, 18th, 30th; Lower Lake region, 5th, 14th; Upper Lake region, 16th, 30th; extreme Northwest, Ft. Stevenson, 13th, 17th; Upper Mississippi valley, 7th, 8th, 10th, 11th, 18th, 30th; Missouri valley, 7th, 10th, 11th, 17th, 18th; Southern slope, 1st, 2d, 10th, 11th; Middle slope, 10th, 11th, 17th; Southern plateau, Camp Thomas, Ariz., 9th; North Pacific coast region, Roseburg, 17th; Middle Pacific coast region, Red Bluff, 15th.

*Zodiacal Light.*—Nashville, Tenn., 2d, 13th, 14th, 19th, 20th, 25th, 26th, 27th, 28th, 29th; Chattanooga, 14th; Cresco, Ia., 19th; Cambridge, Mass., 11th, 14th, 15th, 20th, 25th, 26th; Somerset, Mass., 22d, 24th, 25th; Clear Creek, Neb., 18th to 24th; Wytheville, Va., 13th; New Corydon, Ind., 2d, 4th, 21st, 22d, 23d, 25th, 27th to 30th.

## OPTICAL PHENOMENA.

*Lunar halos* have been observed in the various districts on the following dates: New England, 3d to 7th, 9th, 10th, 11th, 29th, 30th; Middle Atlantic states, 2d, 5th, 6th, 7th, 20th, 27th, 28th, 29th; South Atlantic states, 1st to 3d, 5th, 23d, 28th, 30th; East Gulf states, 1st to 5th, 9th, 28th; West Gulf states, 1st to 4th, 6th, 12th, 13th, 14th, 28th, 30th; Rio Grande valley, 2d, 3d, 13th; Ohio valley and Tennessee, 1st to 6th, 9th, 11th, 16th, 25th, 29th, 30th; Lower Lake region, 1st, 2d, 6th, 7th, 25th, 28th, 29th, 30th; Upper Lake region, 1st, 4th to 6th, 10th, 28th, 29th; extreme Northwest, 5th, 6th, 8th, 27th; Upper Mississippi valley, 1st, 4th, 5th, 6th, 9th, 10th, 18th, 27th, 28th, 29th; Missouri valley, 2d, 5th, 6th, 28th, 29th; Northern slope, 1st, 5th, 9th, 10th, 13th, 26th, 29th, 30th; Middle slope, 1st, 6th, 8th, 28th; Southern slope, 3d, 4th, 28th; Southern plateau, 2d, 3d, 5th, 6th, 27th; Middle plateau, 2d, 5th, 17th, 27th, 30th; Northern plateau, 8th, 14th, 26th, 29th, 30th; North Pacific coast region, 1st, 2d, 13th, 26th; Middle Pacific coast region, 5th, 26th, 29th; South Pacific coast region, 4th, 5th, 26th, 28th, 30th.

*Solar halos* have been observed in the various districts on the following dates: New England, 5th, 7th, 10th, 11th, 21st, 22d, 23d; Middle Atlantic states, 10th, 22d, 28th, 29th; East Gulf states, 10th, 14th, 29th; West Gulf states, Little Rock, 6th; Ohio valley and Tennessee, 6th, 8th to 11th, 17th, 22d to 25th, 29th; Lower Lake region, 6th, 9th, 10th, 11th, 23d, 25th; Upper Lake region, 13th, 20th, 21st, 26th; extreme Northwest, 15th to 18th, 23d; Upper Mississippi

valley, 5th, 10th, 19th, 23d, 29th; Missouri valley, Huron, Dak., 23d; Northern slope, North Platte, 1st, 24th; Middle slope, 6th, 24th, 26th, 29th; Southern slope, Fort Griffin, 19th; Northern plateau, Umatilla, 2d, 12th; North Pacific coast region, Albany, Or., 13; Middle Pacific coast region, 5th, 12th, 26th, 27th.

*Mirāge*.—Northport, Mich., 13th; Indianola, 2d to 4th, 6th, 12th to 14th, 20th, 22d to 23th.

## MISCELLANEOUS PHENOMENA.

*Meteors*.—Yuma, Ariz., 2d, 8 p. m., started from the constellation "Andromeda" at an altitude of 50°; pursued a southeasterly course, and disappeared near the "Pleiades." It started slowly and gradually increased in speed, leaving behind a long train of whitish red color. Louisville, 16th, 7 p. m., very large; made its appearance in eastern sky, about 45° above horizon, and shot over toward the west. When about in the zenith, the head of the meteor seemed to expand, becoming much greater in size and brilliancy. It disappeared in the west, leaving a track behind that remained faintly luminous for fifteen minutes. Wytheville, Va., 2d, 9 p. m., a large meteor was observed at an altitude of 15° or 20° above the horizon in the southeastern sky. Its size was, apparently, equal to that of the full moon. It left a train of hazy white, which disappeared shortly after its flight. Eastport, 20th, very bright, first observed in northern sky; pursued an easterly course; duration of flight, about five seconds. Vevay, Ind., 16th, 7 p. m., very brilliant; illuminated the city and adjacent country. Its course was from zenith to a south-westerly point, where it burst like a rocket. Meteors worthy of less note have been reported as follows: Umatilla, Oreg., 15th; Boise City, Idaho, 8th, 9th, 22d; Pigeon, Nev., 27th, 28th; Yuma, Ariz., 25th; Davenport, 28th; La Crosse, 24th; Springfield, Ill., 11th; Detroit, 20th, numerous; Rio Vista, Cal., 4th, very brilliant; Southington, Conn., 13th, 14th, 15th; New Corydon, Ind., 2d; Vevay, 5th, 12th to 16th, 19th, 22d, 30th; Monticello, Iowa, 12th, 13th, 14th, 17th; Clinton, Iowa, 15th; Woodstock, Md., 13th, 15th; Springfield, Mass., 15th; Fall River, Mass., 20th; Fayette, Miss., 13th, 27th; Corning, Mo., 8th; Arco, N. J., 16th, 22d; Freehold, N. J., 6th, 14th, 22d; Moorestown, N. J., 13th; Vineland, N. J., 15th; Jacksonburg, O., 16th; Fallsington, Pa., 14th; Stateburg, S. C., 9th, 13th, 14th; Clarksville, Tex., 10th, 13th, 20th.

*Earthquakes*.—San Francisco, 11th, 4 p. m., slight shock; 13th, 11.20 p. m., slight shock of about twenty seconds duration. Carson City, Nev., 9th, 10 a. m., sharp shock of two seconds duration; motion from north to south. Berne, Switzerland, 18th, two heavy shocks during the night. Cologne, Prussia, 18th, violent shock of short duration occurred during the night, and slight tremors were felt for several hours after it. On the same night two shocks were felt at Bonn, Germany. These earthquakes originated at Zurich and passed in two waves through western Germany towards Holland. Agram, Austria, 15th, three shocks of earthquake were experienced during the night. Messina, Italy, 16th, two shocks, the first at 1 a. m. and the second at 5.40 a. m.; considerable loss of life and property in the interior. These shocks were felt at Naples, Catanazaro and Cozenza. Pesth, Hungary, 15th, three shocks were experienced during the night. Island of Chios, off the west coast of Asia Minor, near Cape Bianco, 11th, during past week very heavy shocks occurred and the village began sinking into the earth; town abandoned. Chilcoot, Alaska, Oct. 2d, 1.30 p. m. light shock; Oct. 6th, 11 a. m., light shock.

*Migration of Birds*.—*Geese flying south*: Ft. Adams, R. I., 11th; Somerset, Mass., 13th; Fayette, Miss., 10th; Clear Creek, Neb., 5th, 8th, 14th; Palermo, N. Y., 13th; Bellefontaine, O., 6th; Portsmouth, O., 4th; Visalia, Cal., 4th, 6th, 18th, 23rd; Red Bluff, Cal., 8th, 13th; Indianola, 11th, 13th, 23rd; Macon, N. C., 20th. *Flying north*: Red Bluff, 25th; Indianola, 3rd. *Ducks flying south*: Clear Creek, Neb., 14th, 16th; Dubuque, 13th; Indianola, 13th, 19th, 20th. *Blackbirds*: Memphis, 9th, 10th; flying south. *Rice birds*: Memphis, 9th, 10th; flying south.

*Polar Bands*.—Ft. Sill, Ind. Ty., 19th; Mobile, 14th; Augusta, Ga., 3rd; Gardiner, Me., 27th, Fayette, Miss., 18th, 30th; Clear Creek, Neb., 6th, 9th, 10th, 12th, 13th, 16th, 20th, 21st, 22d, 25th, 28th; Auburn, N. H., 17th; Wytheville, Va., 3rd, 5th, 6th, 17th, 26th, 29th; New Corydon, Ind., 21st.

*Prairie Fires*.—St. Vincent, Minn., 12th; Huron, Dak., 2d, 3d, 5th, 6th; Clear Creek, Neb., 6th, 17th; Genoa, Neb., 4th; Yankton, 1st, 4th to 6th, 8th, 16th, 22d, 23d, 25th, 28th; Ft. Gibson, Ind. T., 16th.

*Sand Storms*.—Winnemucca, Nev., 14th. San Carlos, Ariz., 19th, heaviest ever seen at this place; continued from 10 a. m., until midnight. Camp Thomas, Ariz., 1st, 7th, 17th, 19th, 24th.

*Sunsets*.—The characteristics of the sky at sunset, as indicative of fair or foul weather for the succeeding twenty-four hours, have been observed at all Signal Service stations. Reports from 178 stations show 5,296 observations to have been made, of which 27 were reported doubtful; of the remainder, 5,269, or 84.3 per cent., were followed by the expected weather.